

NOTES ON SOUTH AUSTRALIAN MARINE MOLLUSCA, WITH
DESCRIPTIONS OF NEW SPECIES.—PART II.

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PLATE XXXI.

Calliostoma zietzi, *spec. nov.* Pl. xxxi., figs. 1, 2, 3.

Shell small, conic, imperforate, moderately solid. Whorls 8, including protoconch of one smooth turn. First two spire whorls rounded and slightly mammillate, next three straight-sloping, last two rather convex. Suture moderately deep, slightly overhung by peripheral lira. Penultimate whorl with 6 spiral cinguli and 2 inter-liral threadlets. Body whorl with 6 cinguli, rather narrower than the interspaces, and 5 threadlets; barely angulated below its centre by a somewhat stouter cord; base rounded, with 8 concentric liræ, flat, and much wider than the interspaces. Spire and base finely obliquely incised with growth lines, which cut the liræ less than the interspaces. Aperture roundly quadrate. Columella nearly straight, slightly oblique and excavated, subtruncate below; outer lip simple crenulated by cinguli. Height, 8 mm.; diameter of base, 5; aperture, 2.5.

Ornament.—Horn-coloured, peripheral band white. Main cinguli on the spire and those on the base obscurely dotted with light chestnut; peripheral band with larger and plainer spots.

Hab.—Backstairs Passage, St. Vincent Gulf, at 12, 17, and 20 fathoms; 9 dead.

It is named after Mr. A. Zietz, F.L.S., of the Adelaide Museum.

Gena terminalis, *spec. nov.* Pl. xxxi., figs. 4, 5.

Shell minute thin oblong-oval, sides parallel. Whorls 4, spire terminal inconspicuous. Surface smooth and polished but for microscopic accremental lines: no spiral striæ or incisions, except microscopic, on the base of the body-whorl. Colour white, with crowded spiral bands of crescentic white and dark and reddish-brown spots and blotches. Length, 5.75 mm.; width, 3 mm. Radula, ∞ .1.(5.1.5.).1. ∞ ., 36 rows.

Hab.—Dredged alive, Wallaroo Bay, Spencer Gulf 15 fathoms; also alive and dead in deep water, St. Vincent Gulf.

Obs.—The ornament varies greatly. The shell may be blotched pink and white, and there may be numerous fine spiral, hair-like, dark lines.

Diagnosis.—From *G. strigosa*, A. Adams. It is smaller, comparatively narrower, the spire is terminal, the aperture is more oblong, the columella is straighter, the outer lip joins the columella almost at a right angle. A juvenile *G. strigosa*, equal in size to an adult *G. terminalis*, has been drawn in Plate xxxi., fig. 6, for comparison.

It very closely resembles *Gena nigra*, Quoy & Gaimard, Voy. de l'Astrolabe, Zool., Vol. iii., p. 307, Plate lxvi. (bis), figs. 10, 11, 12: but their species, as figured, has its spire less terminal, and rests more upon its two ends, and, according to the dimensions given, is three times as large.

Astele calliston, *spec. nov.* Pl. xxxi., figs. 7, 8.

Shell conical, thin. Spire of nine whorls, including two smooth apical turns; gradated. Whorls straight-sloping, with crowded spiral liræ, about 24 on the penultimate; crossed by oblique crowded accremental striæ, producing sub-lenticular pitting. Suture linear, immediately beneath the prominent peripheral cord which gradates the spire. Body whorl with suture slightly descending at the aperture: spiral threadlets about 24: crowded fine sinuous oblique accremental striæ: periphery acutely angular, with a projecting rounded carina, spirally closely engraved on its upper surface, axially crossed by rounded striæ, much more distant than the accremental striæ, provided at somewhat irregular intervals with 16 rounded invalid tubercles. Base very flatly rounded with 7 concentric narrow liræ, the inner 4 closer than the rest, which are separated by 4 to 6 inter-lirate striæ. Umbilicus narrow, minutely axially incised. Aperture oblique, roundly quadrate: outer lip slightly convex, thin, smooth within, margin sinuously convex below the suture, concave towards the periphery: basal lip convex, slightly effuse, smooth within. Columella, upper third concave, the rest straight, obliquely truncate below: callus at the base partly bordering the umbilicus and attached to the columella along a vertical groove.

Ornament.—Shell purple-brown, with somewhat oblique, axial, creamy, rhomboidal flames, extending from suture to suture, and nearly equalling the foundation colour in area. On the peripheral carina, and hence above the sutures, they are replaced by two or three creamy spots, while two or three less marked white spots occupy the intervals, and thus pick out the tubercles of the carina. Every whorl is encircled by four articulated colour bands, which in the white areas are of a more opaque white than the rest of these areas, and extend slightly beyond them, and are crossed by narrow vertical or oblique red lines, while in the purple areas they are of

a deeper purple tint, and are crossed by narrow axial white lines. The base is of a lighter tint, the outer 6 cinguli of a rose pink, minutely dotted with creamy white. The columella and umbilicus are white, bordered outside with green, which tints the inner two basal cinguli, and curls around the columella into the throat. The inner edge of the outer lip is golden-brown and white, interior shining and nacreous. Operculum horny multispiral, nucleus central, a radial cellular fringe-like film over the inner three-fourths of each spiral. Height, 11.75 mm.; diameter, 9.75; aperture, 4.

Radula, ∞ .1.5.1.5.1. ∞ . Central rachidian heart-shaped, narrow free end surmounted by small, slightly serrated denticle; the other rachidians with trilobed cusps, which gradually enlarge outwards; a single lateral with one cusp trilobed at its base; marginals many unicuspidate, not serrated.

Hab.—Spencer Gulf, 20 fathoms: 32 alive and dead.

Variations.—Some individuals are uniformly pinkish-brown, with white peripheral tubercles, and four pink cinguli on each whorl articulated with white, the larger white spots lying vertically between the supra-sutural tubercles, while narrower, oblique white spots alternate in groups with them.

Clanculus leucomphalus, *spec. nov.* Pl. xxxi, figs. 9, 10, 11.

Shell depressed conic, rather thin. Protoconch one turn and a half smooth. Whorls 6, rapidly increasing, sloping convex. Penultimate with 8 close-set spiral rows of smooth ovate granules. Body-whorls with ten spiral rows of granules above the acutely angled periphery, the granules of the infra-sutural row are much larger and placed axially, the rest spirally ovate; and ten rows on the base of flatter, more quadrate, and more close-set granules. Oblique axial striæ crowd between the granules on the spire, but are obsolete on the base.

Aperture quadrate oblique; outer lip crenulate, toothed just within the margin opposite each spiral lira, within this thickened and wrinkled, and in the throat lirate and nacreous; basal lip crenulate, thickened within with 5 teeth gradually enlarging towards the columella; columella oblique, nearly straight, ending below in a prominent, obliquely furrowed but not bifid tooth, with a large tubercle at the junction of its upper and middle third, and with a flange throughout its whole length bent towards the umbilicus. The umbilicus is wide and deep, with a funicle winding up its outer side to the tubercle on the columella. The umbilical border over-

hangs, and has 6 medium-sized tubercles, and is margined by a flat, axially incised, spiral lira, with a threadlet on either side.

Colour light ashen-grey, with obscure flames of deeper grey or buff, and with numerous small pink dots on the second and third whorls. The umbilicus and its margin are pure white, the throat nacreous green.

Height, 8 mm.; diameter of base, 9.75 mm.

Hab.—Backstairs Passage, St. Vincent Gulf; dredged alive in 20, 22, 23 fathoms, dead in 6 to 23 fathoms.

Diagnosis.—The type from Gray's collection of *Trochus clangulus*, Wood, in the Natural History Museum, London, differs from our species in having a more sinuous columella, due to a large tubercle at each end, and a median bulge, only 6 liræ on the penultimate whorl, stouter and fewer liræ in the throat, a less rounded periphery, its colour light pink, with pink spots on the base, and articulated deep pink just above and below the suture, and green and red tints instead of light ashen-grey with darker buff flammules.

Crassatellites ponderosus, Gmelin.

This is the name suggested by Mr. Hedley, in P.R.S. of N.S.W., 1904, Part 1, page 198, for *C. castanea*, Reeve, as also for *C. kingicola*, Lamk.; *C. donacina*, Lamk.; *C. decipiens*, Reeve; *C. erroneus*, Reeve; *C. pulchra*, Reeve; and *C. cumingi*, A. Adams, which E. A. Smith and Brazier had previously united under the name of *C. kingicola*, Lamk. Gmelin's shell, which was first defined in pre-Linnean times by Chemnitz, is cited by von Martens in *Malak. Blat.* xix., 1872, page 30, as from New Guinea. In *Syst. Naturæ*, C. Linné, vi. Vermes, page 3280, it is given as *Venus ponderosa*, No. 54, as inhabiting the Southern Ocean.

Some 40 specimens have been dredged by me in South Australian waters, of which 26 are single values. Living individuals were found at 20 fathoms, off Normanville, at 19 fathoms off Eastern Cove, Kangaroo Island, and at 15 fathoms off Wallaroo. These form the material on which the following observations were based.

All the species above-named, except *C. castanea*, are validly corrugated by sub-distant concentric ribs. Not one of my forty examples is so corrugated. It is, therefore, least like *C. kingicola*, Lamk. But I only possess one cabinet specimen of each of them. Perhaps a large series would show examples with smooth surfaces near the umbos.

Size.—The largest measures 115 mm. antero-posteriorly, 90 mm. umbo-ventrally, and 49 mm. in section, and weighs ten ounces.

Shape.—This varies a good deal, as is noted in Conch. Cab., Band x., Abtheil i., page 2; Taf. i., fig. 1; Taf. vi., fig. 1, 1886, where two figures are given, one of a shell 88 mm. by 75 by 42, and another much produced posteriorly, 98 by 73 by 50. One from Port Lincoln, a rounded form, is 112 mm. by 93, while another very produced behind is 115 mm. by 90. This is not merely a senile tendency, for the difference in contour is found in young shells, and also in those of equal size and apparently of similar age. In the produced individuals the ventral outline, instead of being uniformly convex as far as the postero-inferior angle, may be somewhat concave in front of this.

Thickness.—It is very solid; the heaviest shell we have on our coast; it may weigh 10·75 ounces. Often growth in superficial area ceases after a time, and then the thickness greatly increases. Thus a shell only 3·7 inches long and 3·1 deep is 2·05 in section, and weighs 10·75 ounces, whereas another 4·25 inches long and 3·5 deep is only 1·9 inches in section, and weighs but 8 ounces. The volume of the contained mollusc actually diminishes, the thickening taking place at its expense. The muscular impressions appear deeply excavated then, owing to the heaping up of shelly material around the adductor muscles beneath the mantle. The ventral margin, instead of being sharp, is flattened for as much as an inch, nearly at right angles to the external surface, and is in some cases even incurved.

Periostracum.—This is very durable, and even in dead and decaying valves is frequently present, and allows very fair cabinet specimens to be prepared from very unpromising material by a little careful scraping. It disappears sometimes first at the umbos and the subjacent surface, then erodes deeply. My largest individual, taken alive, has only a little of its epidermis remaining along the ventral and posterior borders, and its face value has been thus greatly depreciated.

Interior.—This is smooth down to the pallial line, which is slightly crinkled, and thence on there are radial striæ which fade out towards the ventral margin. The older the shell the deeper is the pallial line, and wider posteriorly, and more markedly crinkled, and the more rugose become the radial striæ beyond.

Colour.—The interior is white, with a beautiful glistening chestnut or burnt-umber colouring of certain parts. The frequency and depth of tinting of these parts is in the following order:—The posterior adductor scar, the posterior part of the pallial line, the anterior portion of the anterior adductor scar, the posterior margin, the ventral margin, and the posterior part of the cartilage pit and hinge plate. Some-

times the colour is a very deep, almost blackish-brown, with a delicate flesh tint, and one is tinted a pretty purplish-pink.

Carinaria australis, Quoy & Gaimard.

Quoy & Gaimard, *Voy. de l'Astrolabe*, Zool., vol. ii., page 394, Pl. xxix., figs. 9, 13, 1833. The type specimen was dredged between New Holland and New Zealand in January, 1827. Mr. Hedley supplied me with the following quotation from *Voy. de l'Astrolabe*, *Histoire du Voyage* ii., 1830, page 27:—"January 2, 1827, the zoologists collected some living carinarias, the shells of which attained a length of eight to ten lines." The next day the vessel was 130 leagues from Port Jackson, on the way to Cook's Straits, New Zealand. Allowing about a hundred to a hundred and fifty miles for the day's run, we can fix the locality of the haul of *Carinarias* at about 158° E. longitude and 40° S. latitude. My single specimen was taken in January, 1905, in 104 fathoms, in sandy ooze, 35 miles south-west of the Neptune Islands, below the entrance to Spencer Gulf, in E. longitude 135°40', and S. latitude 35°25'. So its *habitat* is extended some 22 or 23 degrees to the west. It measures 10 mm. in length and 3.75 in width. Several characters can be added to those given by the authors. The transverse ridges spreading fan-like from the posterior part to the carina increase in number by intercalation of secondary and tertiary ridges. The carina is undulated in its proximal part, where it springs from the shell, but its distal edge is straight, not corrugated, and only at the back part, where the distal border has been worn or broken away, is it actually undulated at the margin. The aperture is oval, and is about twice as wide towards the posterior part as at the anterior. From within a portion of the protoconch can be seen projecting through the posterior wall of the shell somewhat obliquely and slightly to the right of the middle line. The record of this shell adds not only a new species and a new genus to the South Australian list of marine molluscs, but a new order of Gasteropods: the Nucleobranchiata. Atlanta, another genus of this order, is also represented by an undetermined species taken in the same haul.

Gibbula lehmanni, Menke.

Turbo lehmanni, Menke, *Moll. Nov. Holl.*, page 18; *Trochus lehmanni*, Philippi, *Conchyl. Cab. Band ii.*, Abth. iii., page 185, t. 28, fig. 15; Fischer, *Coq. Viv.*, page 362, t. iii., fig. 3; *Gibbula pulchra*, A. Ads. *P.Z.S.*, 1851, page 187; *Gibbula lehmanni*, Menke, *Tryon, Man. of Conch.* xi., page 233, Plate xl., figs. 12, 13.

This is a fairly common species. It has been dredged alive at 14 and 25 fathoms in Spencer Gulf, and dead at 15

fathoms in Wallaroo Bay. It has hitherto been confused in South Australia with *G. Cori*, Angas, so I give the following diagnostic characters:—*G. Cori* is more solid, slightly less depressed, rather more concave between the carinæ, with sharper spiral liræ, and a much smaller umbilicus. This last character is the easiest diagnostic. The radial flames are much fewer, the colour elsewhere is irregularly stippled instead of spirally articulated, and there are fewer colours in the same shell. Mr. J. H. Gatliff has sent me this shell as *G. sulcosa*, A. Adams, P.Z.S., 1851, page 186, recorded in his Catalogue of the Marine Shells of Victoria, P.R. Soc. of Vict. xiv. (N.S.), Part ii., 1902, page 132. Adams's name is given in Tryon's Man. of Conch. xi., page 243, "unfigured and undetermined species," with the *habitat*, Sir C. Hardy's Island, North Australia.

***Astele subcarinatum*, Swainson.**

Astele subcarinatum, Swns., 1854, P.R.S., Van Diemen's Land, vol. iii., page 36, Plate vi., figs. 1, 2; *Eutrochus perspectivus*, A. Adams, P.Z.S., Lond., 1863, page 506; *Calliostoma (Eutrochus) Adamsi*, Pilsbry., Man. Conch. xi., page 402.

It has been dredged alive at 16, 19, 20, 22, 23 fathoms, in Backstairs Passage, and off Newland Head.

Zizyphinus subgranularis, Dunker, Malak. Blätt, 1871, page 170, No. 56, unfigured, from Bass Straits; *C. subgranulatum*, Dunker, Man. Conch. xi., page 403, is a half-grown individual of the same species. This identification was referred to Mr. Hedley, who says he had arrived at the same conclusion.

EXPLANATION OF PLATE.

PLATE XXXI.

Figs. 1, 2, and 3. *Calliostoma zietzi*, Verco—Basal and profile views, and magnified sculpture.

Figs. 4 and 5. *Gena terminalis*, Verco.

Fig. 6. *Gena nigra*, Quoy & Gaimard.

Figs. 7 and 8. *Astele calliston*, Verco.

Figs. 9, 10, and 11. *Clanculus leucomphalus*, Verco.
